# Louisiana State University Health Sciences Center New Orleans

## Lock Out Tag Out Training

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- What is LOTO
- Importance of LOTO
- LSUHSC's LOTO program

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## What is LOTO?

- refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities
  - Electrical
  - Pneumatic
  - Hydraulic
  - Mechanical

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## What is LOTO?

- Accomplished by disengaging or blocking **all** energy sources, dissipating residual energy and taking measures to ensure the system sources remain locked in the off position through the completion of work

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**Definitions:**

- **Authorized employee** – an employee that actually locks/tags equipment to perform work.

- **Affected employee** – NOT qualified to lock/tag-out equipment, but uses a machine which may need servicing OR someone that works in/around an area where equipment is locked/tagged out

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- **Energy Source** –What makes the piece of equipment run, move or operate. May be a single energy source, or multiple.

- **Energized** – connected to an energy source or when a piece of equipment contains residual or stored energy

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- **Energy isolating device** – A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following:
  - a manually operated electrical circuit breaker;
  - a disconnect switch;
  - a line valve;
  - a block;
  - and any similar device used to block or isolate energy.

- Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

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- **Servicing and/or maintenance.** Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment, to include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes.

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**Capable of being locked out** -

a energy isolating device **must** be locked out if it is available on the piece of equipment.

- Designed with a hasp to which a lock can be affixed
- Has locking mechanism built in
- Can be locked without dismantling the energy isolating device or permanently altering its control capability

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- **Lockout** - placement of a lock on an energy-isolating device to ensure the equipment cannot be operated during equipment maintenance or repair.

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## Types of Lockout Devices

Pneumatic Device

Valve Device

Plug Device

Breaker Device

Fuse Device

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- **Tagout -** placement of a tag on an energy-isolating device to **warn** of the danger of operating, and TO NOT start, the equipment until the tag is properly removed

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## Why LOTO?

- Protects personnel from potential injury
- OSHA standard, 29 CFR 1910.147
  - 150 – 200 fatalities each year
  - 60,000 accidents
- BSL Survey
  - "…80 percent of workers surveyed failed to turn off the equipment before performing the service work."

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## Hazardous Energy Control Policy – EHS 400.05

- Responsibilities
- Implementation
  - When should LOTO be used
  - Procedures
  - Equipment
- Training and Education
- Recordkeeping
- Inspection and Program Review

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## EH&S Roles and Responsibilities

- Coordinate the program
- Training
- Assist with procedure development
- Routine performance inspections/evaluations
- Issue tags
- Maintain records
- Update and evaluate the program annually

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## Facility Services Supervisors Roles and Responsibilities

- Develop written procedures
- Develop and maintain LOTO applicable inventory of equipment, machinery and operations
- Designate authorized employees
- Ensure training of authorized and affected persons
- Oversee LOTO operations

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## Employees Roles and Responsibilities

- Understand and comply with requirements of LOTO policy

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## When should LOTO be used?

- Used during all routine and **emergency** maintenance and servicing of equipment, machines and processes, including:
  - activities which involve cleaning and lubricating of or removing jams from equipment, machines or processes
  - Use of computer controlled apparatus that might initiate startup or energization of equipment
  - Cleaning electrical circuits

*** Any activity(s) that require the bypassing of guard or safety device and/or any part of body put into/near point of operation

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## When should LOTO be used?

- Does not apply to:
  - minor tool changes, adjustments and servicing activities that are considered part of the normal production operations (guard or other safety device remains in place)
  - disconnection of cord from a power supply, provided that the cord / plug connection can be seen by the repair or service person during work activities

# Shutdown Procedures

| # | STEP | DESCRIPTION |
|---|---|---|
| 1 | ***Notify*** | Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. |
| 2 | ***Review Lockout Procedure*** | The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy. |
| 3 | ***Perform Machine Stop*** | If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.). |
| 4 | ***Isolate Energy*** | De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s). |
| 5 | ***Lockout Energy*** | Lock out the energy isolating device(s) with assigned individual lock(s). |
| 6 | ***Dissipate Energy*** | Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc |
| 7 | ***Attempt Restart*** | Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.<br>*Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.* |

# Procedure

LSU

LOCKOUT TAGOUT PROCEDURE

Description: Chilled Water Pump ET5-5B | Equipment #: ET5-5B

Building: Power Plant | Area: Mezzanine | Origin Date: 8/1/2007

3 LOCKS & TAGS NEEDED

NEXT AUDIT DUE MAR 2008 | NEXT AUDIT DUE MAR 2009 | NEXT AUDIT DUE MAR 2010 | NEXT AUDIT DUE MAR 2011

East Side View


North Side View


South Side View


ALWAYS PERFORM A MACHINE STOP BEFORE LOCKING OUT DISCONNECTS

| ID | Source | Device | Location | Method | Check |
|---|---|---|---|---|---|
| E-2 | Electrical 480V | Padlock | Isolation point on East side of pump. | Move E-2 disconnect to off. Lock out. | Attempt restart at CP-2. |
| W-1 | Chilled Water Suction | Gate valve device | Isolation point on West side of pump. | Turn W-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| W-2 | Chilled Water Discharge | Gate valve device | Isolation point on East side of pump. | Turn W-2 valve to closed position. Lock out. | Verify pressure has bled off. |

DANGER

OPENING A GUARD DOES NOT CONSTITUTE A LOCKOUT

Any machine modifications must be shown in procedure. Contact safety dept. to update procedure.

DANGER

EEC 866-772-7541

*Safety Is Your Responsibility!*

Page 1 of 1 LOTO 082 - Chilled Water Pump ET5-5B

1

2

3

# MEB Boiler #1

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## LOCKOUT TAGOUT PROCEDURE
CFR 1910.147

| Developed by | Reviewed by | Revised by |
|---|---|---|
| ESC | ESC | |

Description: Cleaver Brooks Boiler #1 — Equipment #: LA029231

Bldg: Medical Education Building (MEB) — Area: 1st Floor Engin — Revn: 0 — Date: N/A — Origin Date: 8/3/2007

**7** **LOCKS & TAGS NEEDED**

**DANGER**
Confined Space. Obtain proper permits prior to servicing.

NEXT AUDIT DUE AUG 2008 | NEXT AUDIT DUE AUG 2009 | NEXT AUDIT DUE AUG 2010 | NEXT AUDIT DUE AUG 2011

Northeast Side View


Northeast Side View


Northwest Side View


**ALWAYS PERFORM A MACHINE STOP BEFORE LOCKING OUT DISCONNECTS**

| ID | Source | Device | Location | Method | Check |
|---|---|---|---|---|---|
| E-1 | Electrical 460V | Padlock | Isolation point on West side of boiler. | Pull fuses at E-1, install blocks. Lock out. | Attempt restart at CP-1. |
| W-1 | Boiler Feed Water Inlet | Gate valve device | Isolation point on West side of boiler. | Turn W-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| W-2 | Potable Water Outlet | Gate valve device | Isolation point on East side of boiler. | Turn W-2 valve to closed position. Lock out. | Verify pressure has bled off. |
| W-3 | Potable Water Outlet | Gate valve device | Isolation point on North side of boiler. | Turn W-3 valve to closed position. Lock out. | Verify pressure has bled off. |
| V-1 | Chemical Inlet | Gate valve device | Isolation point on West side of boiler. | Turn V-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| G-1 | Gas Natural Gas | Ball valve device | Isolation point on East side of boiler. | Turn G-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| S-1 | Steam Outlet | Gate valve device | Isolation point located above boiler. | Turn S-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| | Thermal Energy | Be sure to wait until heat has dissipated from machine before servicing. Wear proper PPE before beginning work. | | | |

DANGER **OPENING A GUARD DOES NOT CONSTITUTE A LOCKOUT** DANGER

Any machine modifications must be shown in procedure. Contact safety dept. to update procedure.

ESC

***Safety Is Your Responsibility!***

# MEB Boiler #1

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**LOCKOUT TAGOUT PROCEDURE**
CFR 1910.147

| Developed by | Reviewed by | Revised by |
|---|---|---|
| ESC | ESC | |

Description: Cleaver Brooks Boiler #1 — Equipment #: LA029231

Bldg: Medical Education Building (MEB) | Area: 1st Floor Engin | Revn: 0 | Date: N/A | Origin Date: 8/3/2007

7 **LOCKS & TAGS NEEDED**

**DANGER**

Confined Space. Obtain proper permits prior to servicing.

- 7 locks
- Confined Space

# MEB Boiler #1

Northeast Side View


Northeast Side View


Northwest Side View


**ALWAYS PERFORM A MACHINE STOP BEFORE LOCKING OUT DISCONNECTS**

| ID | Source | Device | Location | Method | Check |
|---|---|---|---|---|---|
| E-1 | Electrical 460V | Padlock | Isolation point on West side of boiler. | Pull fuses at E-1, install blocks. Lock out. | Attempt restart at CP-1. |
| W-1 | Boiler Feed Water Inlet | Gate valve device | Isolation point on West side of boiler. | Turn W-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| W-2 | Potable Water Outlet | Gate valve device | Isolation point on East side of boiler. | Turn W-2 valve to closed position. Lock out. | Verify pressure has bled off. |
| W-3 | Potable Water Outlet | Gate valve device | Isolation point on North side of boiler. | Turn W-3 valve to closed position. Lock out. | Verify pressure has bled off. |
| V-1 | Chemical Inlet | Gate valve device | Isolation point on West side of boiler. | Turn V-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| G-1 | Gas Natural Gas | Ball valve device | Isolation point on East side of boiler. | Turn G-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| S-1 | Steam Outlet | Gate valve device | Isolation point located above boiler. | Turn S-1 valve to closed position. Lock out. | Verify pressure has bled off. |
| | Thermal Energy | Be sure to wait until heat has dissipated from machine before servicing. Wear proper PPE before beginning work. | | | |

DANGER **OPENING A GUARD DOES NOT CONSTITUTE A LOCKOUT** DANGER

Any machine modifications must be shown in procedure. Contact safety dept. to update procedure.

# Startup Procedures

| RESTORE TO SERVICE | | |
|---|---|---|
| # | STEP | DESCRIPTION |
| 1 | ***Check Machine*** | Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact. |
| 2 | ***Check Area*** | Check the work area to ensure that all employees have been safely positioned or removed from the area. |
| 3 | ***Verify Machine*** | Verify that the controls are in neutral. |
| 4 | ***Remove Lockout*** | Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require reenergization of the machine before safe removal. |
| 5 | ***Notify*** | Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use. |

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## Group Lockout/Tagout

- Used when multiple employees are working on a single piece of equipment
- Ensures equipment remains locked/tagged until everyone has completed work
- Supervisor is responsible for removing last lock

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## When Can You Remove Someone Else's Lock?

- Supervisor must verify the authorized employee is not at the facility
- Supervisor must try to contact the employee and inform them the lock is being removed
- Supervisor will inspect work area thoroughly
- Supervisor must notify the employee when they return to work

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**<u>NEVER</u> remove a lockout that does not belong to you**

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## Shift or Personnel Changes

- relieving oncoming authorized worker must install his/her lock to the lockout device before the original lock is removed
- designated supervisor must ensure that the transfer task is complete prior to the off-going employee leaving LSUHSC and before the oncoming employee begins work
- after verification is completed by the designated supervisor, the task may be transferred to the new worker

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## Equipment

- Each shop will have a unique color coded lock
- All authorized employees shall have two locks and tags assigned to them
  - Self sticking labels with names attached to locks
- Tags attached to the lock

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## LSUHSC Color Codes

| | |
|---|---|
| Supervisors | Purple |
| Engineering | Yellow |
| Control Shop | Green |
| Electrical | Black |
| Maintenance | Orange |
| Plumbers | Blue |
| General | Red |

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## Annual Training and Audits

- Annual training is required for all authorized and affected persons
- Retraining can occur for the following reasons:
  - You forgot how to use the procedures
  - You had a change in your job assignment
  - Your equipment or process changed where a new energy source is introduced
  - The LOTO procedures change

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## Annual Training and Audits

- EHS additionally complete an annual audit of all training, equipment, energy source evaluations, and devices and procedures.
- Employee understanding of the LOTO program requirements and procedures will also be evaluated randomly throughout the year

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## Recordkeeping

EH&S will use the LOTO Inspection Form (Policy Appendix C) to document that:

- LOTO Policy and Procedures are being maintained and updated
- LOTO equipment is available for use and in good working condition
- LOTO equipment installed on de-energized equipment is being properly used and maintained
- All affected and authorized personnel have been trained

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## Use Common Sense

- Use the procedures as a guide
- If you are unfamiliar with the equipment inspect the energy sources thoroughly
- If you are ever unsure, ask your supervisor
- If there is a discrepancy on a procedure contact your manager immediately

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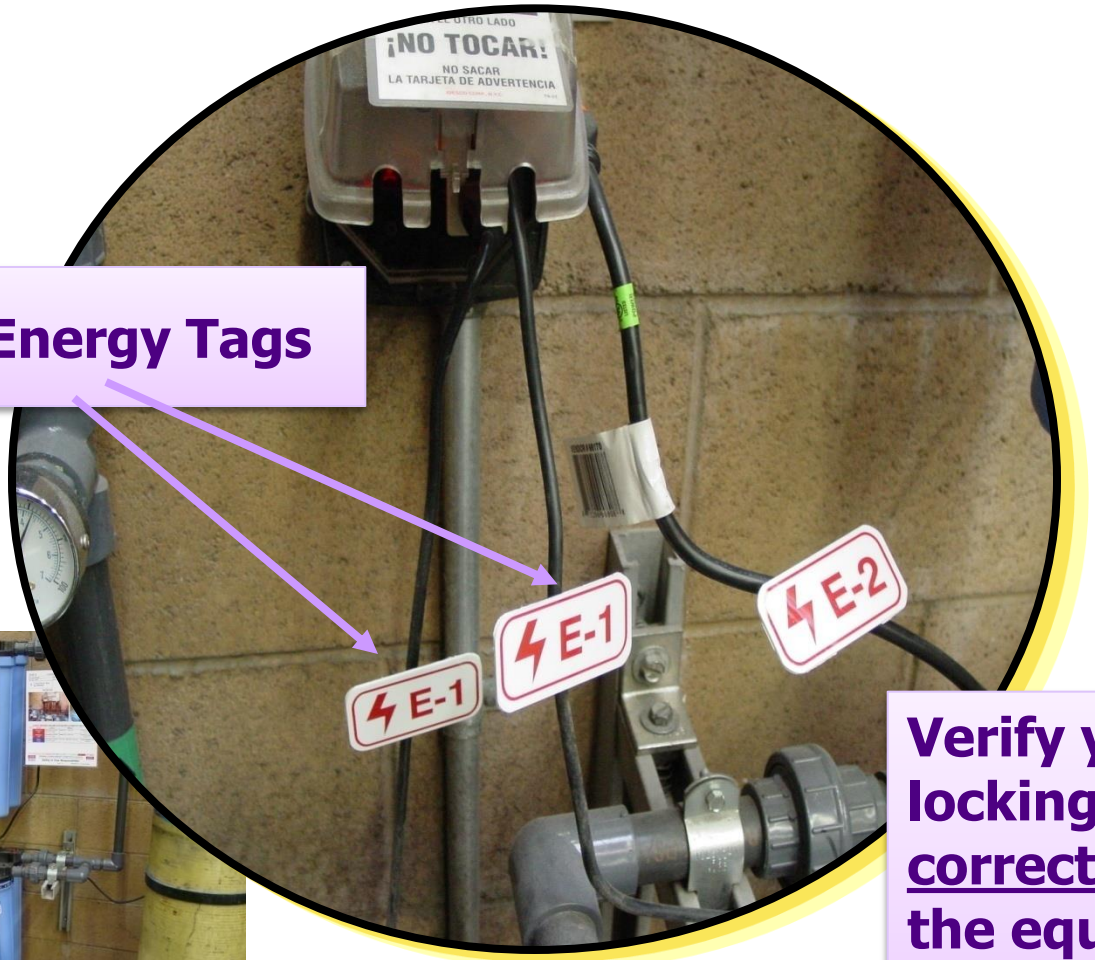
**Identical Energy Tags**




**Verify you are locking out the <u>correct</u> source for the equipment being locked out.**

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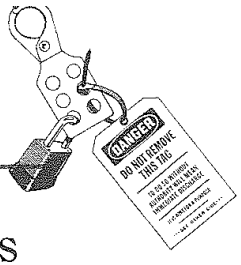
## Quiz




1. True False In a lockout, an energy-isolating device is locked in the safe or off position.

2. True False In a tagout, an energy-isolating device is placed in the safe position and a written warning is attached.

3. True False A worker may use any sturdy lock to apply a lockout.

4. True False Lockout/Tagout should be used whenever you are performing service or maintenance around any machine where you could be injured by unexpected start-up or release of stored energy.

5. True False Each individual employee can decide whether to use lockout, tagout, or both.

6. True False Applying locks or tags in the right places de-energizes the equipment.

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7. True **False** Turning off the power switch removes all energy from powered equipment.

8. True **False** Engineering safety features are fool-proof ways of protecting workers from hazardous energy.

9. **True** False An inspection will be conducted at least once a year to be sure safety procedures are being carried out.

10. **True** False Before lockout/tagout is applied, all workers in the affected area must be notified.

11. **True** False Before you turn off equipment to lock or tag it out, you must know the type of energy it uses, the hazards of that energy, and how to control it.

12. True **False** Once you've isolated a system from its main power source, you can be sure no energy will reach the equipment.

13. True **False** In a lockout, one person is allowed to attach a single lock for an entire work crew.

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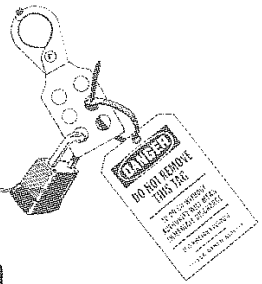


14. (True) False After equipment has been isolated from its power sources, it is still necessary to control any energy stored in the system.

15. (True) False When you're done testing equipment to verify it has been isolated from its energy sources, you must be sure to shut off all machine controls.

16. True (False) Once energy isolation and lockout/tagout have been applied, you can be sure the equipment won't re-energize while you're working on it.

17. (True) False Before removing lockout/tagout devices, you must make sure the danger area is clear of tools and workers.

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18. True (False) When contractors perform maintenance in your workplace, you will be required to change your lockout/tagout procedure.

19. (True) False If you have to temporary re-energize equipment while you're working on it, you must re-apply energy isolation and lockout/tagout as soon as energy is no longer needed in the system.

20. True (False) If a worker is not present to remove their own lock, any co-worker can remove it as long as they make sure it's safe.

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## Questions?

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